PHYS 201 Kinematic Equations Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Equations of Kinematics for constant acceleration are given below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. | 2. | 3. | 4. | 5. |
| $$x=\overbar{v} t$$ | $$x=\frac{1}{2}\left(v\_{0}+v\right)t$$ | $$v=v\_{0}+at$$ | $$x=v\_{0}t+\frac{1}{2}at^{2}$$ | $$v^{2}=v\_{0}^{2}+2ax$$ |

1. Describe each of the terms in the above equations. (First one is done for you)

*a =\_*average acceleration *x = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_t = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
v= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ v0= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*$\overbar{v}$ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Derive the fifth equation using 2 & 3.

3. A person runs at 4.0 m/s for 5 minutes. How far he ran? (Express the answer in km)

4. Suppose a car merges into freeway traffic along a straight ramp. Its initial velocity is 8.5 m/s and it accelerates at 2.2 m/s2 for 9.5 second to reach the traffic speed. Determine (a) the traffic velocity and (b) the ramp length? (Such information might be useful to a traffic engineer.)

5. A plane is landing with a speed of 69 m/s. Once the jet touches down, it can decelerate at 3.2 m/s2. What length of runway is needed to reduce its speed to 5.0 m/s?